CLAIMS

We claim:

1. A method of detecting the presence of *Treponema pallidum* or anti-treponemal antibodies in a biological sample, comprising:

contacting an acidic repeat protein or one or more isolated, immunogenic *Treponema pallidum* peptide of the acidic repeat protein with an antibody-containing biological sample; and

detecting formation of a complex between the immunogenic protein or peptide and the antibody, wherein the presence of the complex indicates the presence of *Treponema pallidum*.

2. The method of claim 1, wherein the isolated immunogenic *Treponema pallidum* peptide is a peptide within a repeat region of the acid repeat protein.

3. The method of claim 1, wherein the immunogenic peptide comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 22, 24, 26, and conservative variations thereof.

4. The method of claim 1, wherein the immunogenic peptide is encoded by a nucleotide sequence as shown in SEQ ID NOs: 1, 3, 5, 19, 21, 23, and 25.

5. The method of claim 1, wherein the immunogenic peptide comprises an amino acid sequence having the sequence shown in SEQ ID NO: 15.

6. The method of claim 1, wherein the *Treponema pallidum* is *T. pallidum* subspecies *pallidum*, *T. pallidum* subspecies *pertenue* (CDC-2 strain), *T. pallidum* subspecies *pertenue* (CDC-1 strain), or *T. pallidum* subspecies *endemicum*.

7. The method of claim 1, wherein detecting the presence of the complex indicates the presence of a disease selected from the group consisting of syphilis, yaws, and bejel.

8. The method of claim 1, wherein the immunogenic peptide comprises the amino acid sequence shown in SEQ ID NO: 2.

9. The method of claim 1, wherein the immunogenic peptide comprises the amino acid sequence shown in SEQ ID NO: 4, and wherein the presence of the complex indicates the presence of yaws.

10. The method of claim 1, wherein the immunogenic peptide comprises the amino acid sequence shown in SEQ ID NO: 6, and wherein the presence of the complex indicates the presence of bejel.

11. The method of claim 1, wherein the peptide is bound to a solid phase.

12. The method of claim 1, wherein the peptide is labeled.

13. The method of claim 12, wherein the label is selected from the group consisting of an electrochemiluminescent label, a chemiluminescent label, an enzymatic label, a bioluminescent label, and a fluorescent label.

14. The method of claim 1, further comprising incubating the peptide-antibody complex with a second antibody specific for the peptide, wherein the second antibody is labeled with a detectable label and binds to the peptide-antibody complex.

15. The method of claim 1, wherein the biological sample comprises wounds, blood, tissues, saliva, semen, vaginal secretions, tears, urine, bone, muscle, cartilage, CSF, skin, or any human tissue or bodily fluid.

16. A method of detecting the presence of *Treponema pallidum* in a biological sample, comprising:

contacting an antibody to an immunogenic *T. pallidum* peptide of an acidic repeat protein with a biological sample; and

detecting formation of a complex between an acidic repeat protein or peptide, if such is in the biological sample, and the antibody, wherein the presence of the complex indicates the presence of *Treponema pallidum*.

17. An isolated, immunogenic *Treponema pallidum* peptide comprising an amino acid sequence as shown in SEQ ID NOs: 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 22, 24, 26 or conservative variations thereof.

18. The immunogenic peptide of claim 17 wherein the *Treponema pallidum* is *T. pallidum* subspecies *pallidum*, *T. pallidum* subspecies *pertenue* (CDC-1 strain), *T. pallidum* subspecies *pertenue* (CDC-2 strain), or *T. pallidum* subspecies *endemicum*.

19. An antibody specific for a *T. pallidum* acidic repeat protein or immunogenic peptide of the acidic repeat protein.

20. The antibody of claim 19 wherein the immunogenic peptide comprises an amino acid sequence as shown in SEQ ID NOs: 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 22, 24, 26 or conservative variations thereof.

21. The antibody of claim 19 wherein the immunogenic peptide is encoded by a nucleotide sequence as shown in SEQ ID NOs: 1, 3, 5, 19, 21, 23, or 25.

22. The antibody of claim 19 wherein the antibody is a monoclonal antibody.

23. An immunogenic composition comprising a pharmaceutically acceptable carrier and an isolated, immunogenic *T. pallidum* peptide in an amount sufficient to induce a protective immune response to *T. pallidum* in a mammal, the immunogenic peptide comprising an amino acid sequence as shown in SEQ ID NOs: 2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 22, 24, 26 or conservative variations thereof.

24. The composition of claim 23, wherein the *Treponema pallidum* is *T. pallidum* subspecies *pallidum*, *T. pallidum* subspecies *pertenue* (CDC-1 strain), *T. pallidum* subspecies *pertenue* (CDC-2 strain), or *T. pallidum* subspecies *endemicum*.

25. The composition of claim 23, wherein the composition is administered to a subject having syphilis, yaws, or bejel.

26. The composition of claim 23, wherein the immunogenic peptide is conjugated to a carrier protein.

27. The method of claim 1, wherein the immunogenic peptide comprises an amino acid sequence having the sequence shown in SEQ ID NO: 20.

28. A kit for detecting *T. pallidum* in a biological sample using the method of claim 1, comprising an acidic repeat protein or one or more isolated, immunogenic *Treponema pallidum* peptide of the acidic repeat protein, and instructions for carrying out the method of claim 1.

29. A kit for detecting *T. pallidum* in a biological sample using the method of claim 16, comprising an antibody to an immunogenic *T. pallidum* peptide of an acidic repeat protein, and instructions for carrying out the method of claim 16.